

## CLAIMS

- 1    1.    A method of restoring backed up data, comprising:  
2        retrieving a list of objects that are restorable by a client;  
3        displaying the list of restorable objects for browsing by a user;  
4        submitting a list of restorable objects marked for restoration by the client;  
5        executing a restoration of the submitted restorable objects via a remote procedure  
6    call such that multiple restore submissions can be made prior to restore execution.
- 1    2.    The method according to claim 1, further including executing multiple restore  
2    submissions concurrently.
- 1    3.    The method according to claim 1, further including initiating a restore session for  
2    the client.
- 1    4.    The method according to claim 3, further including creating a restore engine  
2    process for the retrieving, browsing, submitting and executing of restore objects.
- 1    5.    The method according to claim 4, wherein the client communicates with the  
2    restore engine process via remote procedure calls.
- 1    6.    The method according to claim 4, wherein the restore engine process is created by  
2    a dispatch daemon on a backup storage system server.
- 1    7.    The method according to claim 4, wherein the restore engine process is terminated  
2    upon completion of the restore execution.
- 1    8.    The method according to claim 4, wherein the restore engine process runs on a  
2    backup data storage server and further including creating a work item restore process on

3 the backup data server, a server restore process for generating a stream of data to be  
4 restored, and a client restore process for receiving the data stream.

1 9. The method according to claim 4, further including detecting and identifying  
2 libraries that support associated catalogs of backed up data for processing of backed up  
3 data by the restore engine process.

1 10. The method according to claim 9, further including adding a new library  
2 supporting new methods of backing up data.

1 11. The method according to claim 9, further including determining object types for  
2 backed up data supported by the libraries.

1 12. A method of restoring backed up data, comprising:  
2 initiating a restore session for a first client via a dispatch daemon running on a  
3 data storage server through a graphical user interface associated with the client;  
4 creating a restore engine process in response to a request by the dispatch daemon;  
5 establishing a connection between the graphical user interface and the restore  
6 engine process;  
7 displaying a list of restorable objects for browsing by a user associated with the  
8 client via the graphical user interface under the control of the restore engine process;  
9 determining restorable objects marked for restoration by the user under control of  
10 the restore engine process;  
11 storing a list of marked restorable objects submitted by the client to the restore  
12 engine process; and  
13 executing the restoration of the marked objects under control of the restore engine  
14 process independently of the browsing, marking and submitting of the restorable objects.

1 13. The method according to claim 12, wherein the client communicates with the  
2 restore engine process via remote procedure calls.

1 14. The method according to claim 12, further including supporting a new backup  
2 data method by adding a library corresponding to the new backup data method.

1 15. A data backup and storage system, comprising:  
2 a backup storage system for storing backup data from a client storage system  
3 under control of a user associated with the client, the backup storage system including  
4 a server creating a restore engine process as part of a restore session with a  
5 client, the restore engine communicating with the client via remote procedure calls to  
6 allow the user to browse restorable objects, mark selected ones of the restorable objects  
7 for restoration, submit a list of restorable objects marked by the user, and execute  
8 restoration of the submitted list of restorable objects, wherein the restore execution is  
9 performed independently of the browse, mark and submit operations such that multiple  
10 restore submissions can be made prior to execution of the restore.

1 16. The system according to claim 15, further including a work item restore process, a  
2 server restore process, and a client restore process created by the restore engine process to  
3 form a restore triangle for executing the restore operation.

1 17. The system according to claim 15, wherein the restore engine process processes  
2 libraries upon restore initialization such that libraries can be added to the system for  
3 supporting new backup methods.

1 18. The system according to claim 17, further including a dispatch daemon for  
2 initiating the restore session.

1 19. The system according to claim 15, further including further restore engine  
2 processes corresponding to further restore sessions initiated by additional clients.

- 1 20. The system according to claim 19, further including additional restore triangles for
- 2 executing multiple work item restores concurrently.